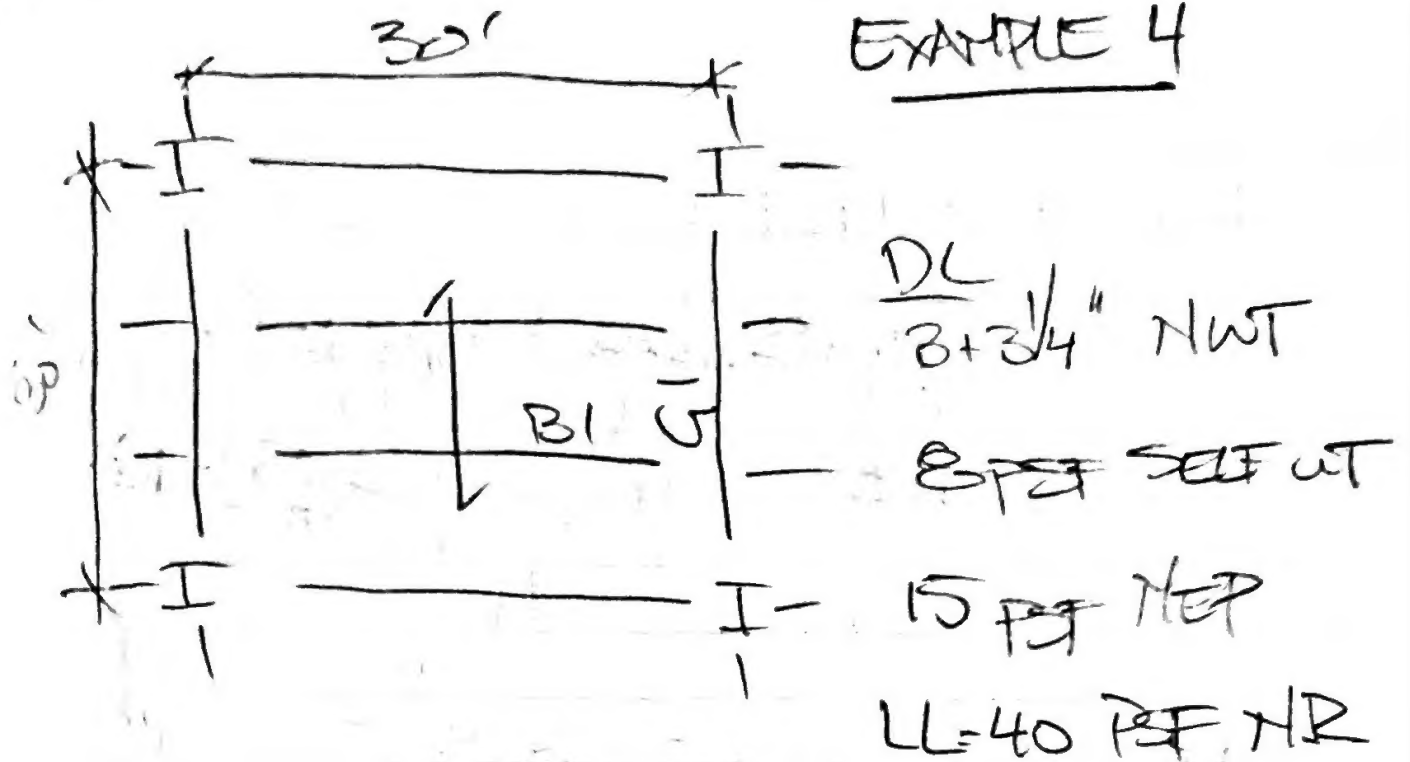


EXAMPLE 4



$$PRE-COMPOSITE = \left[\left(\frac{3'}{2} \right) + 3\frac{1}{4} \right] / 2 \times 50 \text{ GPF}$$

$$= 60 + 8 = 68$$

$$M_{UPRE} = wL^2/8$$

$$w_u = 1.4 \times (10' \times 68 \text{ PSF}) = 952 \text{ \#/ft}$$

$$1.2(10' \times 68) + 1.6(10' \times 90 \text{ PSF}) = \underline{\underline{1136 \text{ \#/ft}}}$$

CONST LL

$$M_u = (1.14)(30')^2/8 = 128 \text{ K-FT}$$

TABLE 3-2: W14x26 IS SMALLEST
w/ $\phi M_n > M_u$, BUT W16x26 HAS
SAME WEIGHT.

TRY W16x26

POST COMP LOAD

$$w_o = (1.4)(10' \times 83 \text{ psf}) = 1162 \text{ lb/ft}$$

$$1.2(10 \times 83) + 1.6(10') \underset{\uparrow}{(40+15)} = 1876$$

PARTITION

$$M_o = 1.88(30)^2/8 = 212 \text{ k-ft}$$

$$b_{eff} \leq \begin{cases} \ell/8_R + \ell/8_L = 30'/4 = \underline{7.5'} \\ s_R/2 + s_L/2 = 10' \\ EOC = NA \end{cases}$$

$$a = \frac{\Sigma G_n}{0.85 f_c b_{eff}}$$

$$\text{ASSUME 1 STD/FT} = 30'/2 = 15$$

$$\Sigma G_n = (15)(17.2 \text{ k}) = 258 \text{ k} \leftarrow \begin{matrix} \uparrow \\ \text{TAB 3-21} \end{matrix}$$

$$a = 258 \text{ k} / 0.85(4)(7.5 \times 12) = 0.94'$$

$$y_d = 6.25 - 0.94/2 = 5.78 \text{ k} \leftarrow$$

ENTER INTO
TABLE 3-19

(SEE EX 3 FOR INTERP)

$$\phi M_n = 336$$

[CHECK DEFLECTION] PER EX 3

HAND CALC GAVE $I_{LB} = 883.04$

OR

USE TABLE 3-20

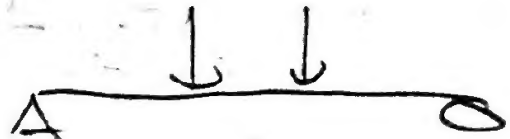
FOR $y_2 = 5.78''$ & $E_n = 250^k$

$$\left(\left[\frac{889 + 934}{2} \right] + \left[\frac{830 + 871}{2} \right] \right) / 2$$

$$I_{LB} = 880 \text{ in}^4 \checkmark$$

CHECK GIRDER:

$P_{DE} =$



$$1.4(68 \times 10 \times 30) = 28.6^k$$

$$1.2(68 \times 10 \times 30) + 1.6(20 \times 10 \times 30) = \underline{34^k}$$

$$M_u \cdot P_u = 34^k \times 10' = 340 \text{ k-ft}$$

BEAM BRACE AT $1/3$ PTS $\Rightarrow L_b = 10'$
 $C_b = 1.0$

USE TABLE 3-10

\Rightarrow TRY W14x55 $\phi M_n = 408 \text{ k-ft}$
(W14x55 IS NEXT BUT
SAME WEIGHT, SO W14x55 MORE EFFICIENT)

COMPOSITE STRENGTH:

$$P_u = 1.2(83 \text{ psf} \times 10' \times 30') + 1.6(55 \text{ psf} \times 10' \times 30')$$

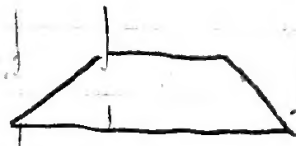
$$P_u = 56^k$$

$$M_u = P \times a = 56^k \times 10' = 560 \text{ k-ft}$$

TRY 1 STUD/FT

SINCE N IS FROM $0 \rightarrow M_{MAX}$

$$N = 30' / 3 = 10 \text{ STUDS}$$



$$\Sigma Q_n = (21.5^k)(10) = 215^k$$

DECK PARALLEL
TAB 3-21

$$b_{eff} \leq \begin{cases} 30/4 = 7.5' \leftarrow \text{GOVERN} \\ S_o = 30' \\ EOS = NA \end{cases}$$

$$a = \frac{\Sigma Q_n}{0.85 f_c b_{eff}} = \frac{215^k}{0.85(4)(90'')} = 0.70''$$

$$y/2 = 6.25 - 0.70/a = 6'' \Rightarrow \text{TAB 3-19}$$

$$\Sigma Q_n = 215$$

$$\phi M_n = \frac{715 + 679}{2} = \underline{\underline{712 \text{ k-ft}}}$$

OK ✓

DEFL

$$\Delta = Pl^3 / 28EI \quad (\text{TABLE 3-23})$$

$$\text{INITIAL DEFL} = \frac{(30' \times 10' \times 68)(30 \times 12)^3}{28E(I_0 = 1140)} = 1.02''$$

CAMBER 80% \Rightarrow CAMBER $3/4''$

POST GMP DEFL.

$$I_{LB} (\text{TAB 3-20}) = \frac{(2290 + 2010)}{2} = 2150$$

$$\Delta_{LL} = \frac{(30' \times 10' \times 55)(30 \times 12)^3}{28E(I_{LB} = 2150)} = 0.44''$$

$$L/360 = 30' / 360 = 1'' \text{ ok } \checkmark$$

$$\Delta_{\text{POST}} = \frac{(30' \times 10' (55 + 15)) (30 \times 12)^3}{28E(I_{LB} = 2150)} = 0.56''$$

ONLY REMAINING Δ

$$\Delta_{\text{TOT}} = 1.02'' - 3/4'' + 0.56'' = 0.83''$$

$$L/240 = 1.5'' \text{ ok } \checkmark$$

USE W21x55 $< 3/4''$